

Middle Middle Miocene Progradational Play

MM7 P1, #1661

Cibicides opima through *Bigenerina humblei*

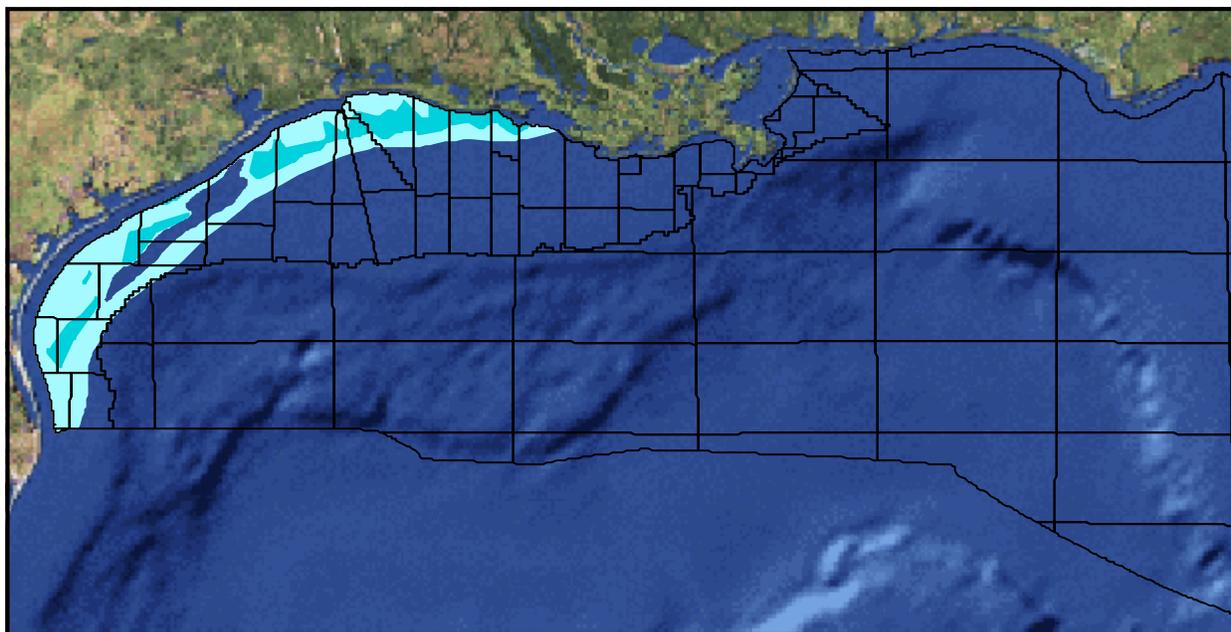


Figure 276. MM7 P1 map showing location of play. Play limit shown in light cyan; hydrocarbon limit shown in dark cyan.

Overview

The Middle Middle Miocene Progradational Play (MM7 P1) contains reserves of 8,523.029 Bcfg and 142.975 MMbo (1,659.528 MMBOE) in 221 sands in 70 fields. The play extends across the modern GOM shelf from the South Padre Island to Eugene Island Area ([Figure 276](#)).

Description

MM7 P1 is defined by (1) a progradational depositional style representing major regressive episodes in which sediments outbuild onto the shelf and slope and (2) the MM-5, MM-6, and MM-7 Chronozones, the tops of which are defined by the *Cibicides opima*, *Cristellaria* "I", and *Bigenerina humblei* biozones, respectively ([Figure 8](#)).

MM7 P1 extends across the modern GOM shelf from the South Padre Island Area offshore Texas to the Eugene Island Area offshore Louisiana ([Figure 276](#)). Hydrocarbons have been found in much of this area.

Instead of two separate delta systems supplying sediment to the offshore Texas area like in lower middle Miocene (MM4) time, a single large delta system, the South Brazos, became the dominant supplier of sediment in MM7 time, as the North Padre Delta System shifted much farther inland with the widespread MM4, *Amphistegina* "B" flooding event (Morton et al., 1985). The South Brazos Delta occupied what had previously been an interdeltaic embayment (Morton et al., 1985). The ancestral Mississippi River Delta System supplied sediment to the Louisiana offshore in MM7 time.

MM7 P1 extends laterally over a greater geographic area than does the progradational deposits of the Lower Middle Miocene (MM4) Chronozone. In addition, progradational sands of MM7 time occur farther basinward than those deposited in MM4 time.

Play Limits

Updip, the play extends onshore into Texas and Louisiana. The play continues to the southwest into onshore Texas and Mexican national waters. To the

east, the play extends onshore into Louisiana. MM7 P1 deposits grade into the sediments of the Middle Middle Miocene Fan 1 Play (MM7 F1) in a downdip direction. In parts of the Mustang Island, Matagorda Island, Brazos, and Galveston Areas offshore Texas, MM7 P1 is limited by the Middle Middle Miocene Structural Corsair (MM7 S1) and the Middle Middle Miocene Structural Seagull (MM7 S2) Plays.

Depositional Style

Sediments deposited predominantly on the shelf characterize MM7 P1, with less common, generally finer-grained sediments deposited on the upper slope also occurring. These sediments represent major episodes in which outbuilding of both the shelf and slope occurs.

The MM7 progradational interval varies from approximately 50 to more than 6,000 ft in thickness, with net sand thicknesses as much as approximately 600 ft. MM7 P1 is punctuated by well developed flooding surfaces associated with the *Cristellaria* "I" and *Bigenerina humblei* biozones. Progradational depositional facies, predominantly comprising delta fringe sediments, shelf blanket sands, channel/levee complexes, and distributary mouth bars, characterize MM7 P1. These facies exhibit upward-coarsening (distributary mouth bars and delta fringe) and blocky to upward-fining (channel/levee complexes) log signatures. The thickest sand-dominated intervals probably represent stacked facies of multiple episodes of delta-lobe switching and progradation. The play less commonly contains delta slump deposits that exhibit a serrated, blocky log signature and crevasse splay deposits that have an upward-fining log signature. In the western portion of the play, many of the progradational sands in the MM7 Chronozone are underlain by a thick shale section. Additionally, some of the fields in the play have a very well-developed aggradational section above the MM7 progradational sands. In the eastern portion of the play, the MM7 progradational section is overlain by retrogradational facies.

Structural Style

The majority of fields in MM7 P1 are structurally associated with normal faults and anticlines. The remaining fields are associated with growth fault anticlines and shale diapirs, with traps on the flanks of the diapir or in sediment drape over the diapir.

Quantitative Attributes

On the basis of reserves calculations, MM7 P1 contains 91% gas and 9% oil. The 221 sands in the play comprise 456 reservoirs, of which 420 are non-associated gas, 18 are undersaturated oil, and 18 are saturated oil. Proved reserves are estimated at 8,520.126 Bcfg and 142.963 MMbo (1,659.000 MMBOE) in 219 sands in 69 fields ([Table 131](#)). Unproved reserves are estimated at 2.903 Bcfg and 0.012 MMbo (0.528 MMBOE) in 2 sands in 1 field. These proved plus unproved reserves account for 60% of the reserves for the MM7 Chronozone.

	No. of Sands	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)
Proved	219	142.963	8,520.126	1,659.000
Cum. production	206	129.326	7,680.830	1,496.022
Remaining proved	110	13.637	839.297	162.978
Unproved	2	0.012	2.903	0.528

Table 131. MM7 P1 reserves and cumulative production.

Cumulative production from MM7 P1 totals 7,680.830 Bcfg and 129.326 MMbo (1,496.022 MMBOE) from 206 sands in 68 fields. This production accounts for less than 65% of the MM7 Chronozone's total production. Remaining proved reserves in the play are 839.297 Bcfg and 13.637 MMbo (162.978 MMBOE) in 110 sands in 48 fields.

[Table 132](#) summarizes that water depths of the fields in MM7 P1 range from 11-274 ft, and play interval discovery depths vary from 3,514-15,131 ft, subsea. Additionally, porosity and water saturation range from 15-35% and 16-63%, respectively.

221 Sands	Min	Mean	Max
Water depth (ft)	11	73	274
Subsea depth (ft)	3,514	8,499	15,131
Reservoirs per sand	1	2	15
Porosity	15%	27%	35%
Water saturation	16%	31%	63%

Table 132. MM7 P1 sand attributes. Values are volume-weighted averages of individual reservoir attributes.

Exploration History

MM7 P1 has a 45-year history of discoveries ([Figure 277](#)). The first sands in the play were discovered in 1954 in the West Cameron 110 and West Cameron 149 Fields. The maximum number of sands discovered in any year was 13, which occurred in both 1977 and 1985, both from six fields. However, the maximum yearly reserves of

313.922 MMBOE were added in 1958 with the discovery of 6 sands in four fields. Almost the same amount of reserves was added in 1957 as well. Discoveries peaked in the late-1970's through 1980's, when 118 sands were added to the play.

The largest two sands in the play were discovered in the late-1950's in the Tiger Shoal and East Cameron 64 Fields and contain an estimated 213.657 MMBOE and 206.863 MMBOE, respectively (Figure 278). No sands containing 100-200 MMBOE have been discovered in the play. The mean sand size for the play is 7.509 MMBOE. Since the first Atlas database cutoff of January 1, 1995, 13 sands have been discovered, the largest of which is estimated to contain 1.933 MMBOE.

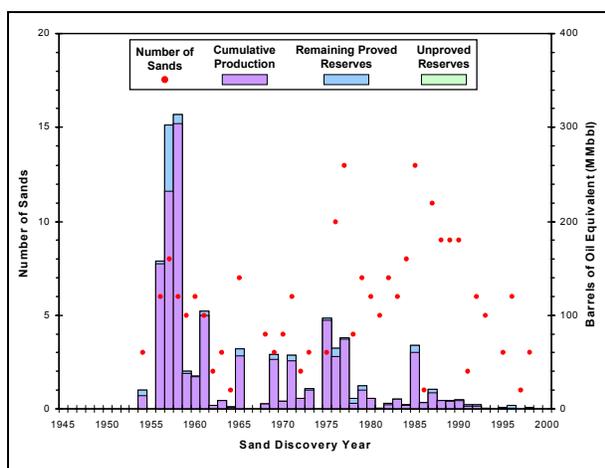


Figure 277. MM7 P1 exploration history graph showing reserves and number of sands discovered by year.

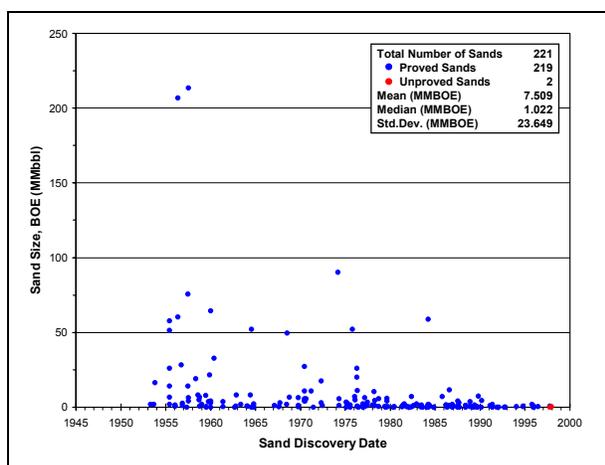


Figure 278. MM7 P1 sand discovery graph showing the size of sands discovered by year.

Production History

MM7 P1 has a 42-year history of production (Figure 279). Production from the play began in 1957. Gas production generally increased throughout the 1960's and early 1970's, reaching a peak yearly production value in 1978. Since then, gas production has generally decreased to about 25% of the 1978 peak value. Yearly oil production values increased through the 1960's, leveling off and fluctuating through the mid-1980's. Oil production then reached a peak yearly production value in 1989, and has since decreased to about one-sixth this amount.

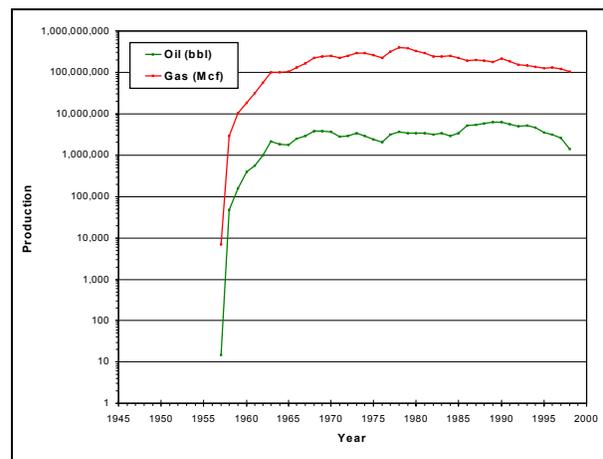


Figure 279. MM7 P1 production graph showing oil and gas production by year.